"In pursuance of this scheme the Commercial Intelligence Branch of the Board of Trade (73 Basinghall Street, E.C.) are issuing to manufacturers and merchants, trade associations and chambers of commerce, monographs giving information with regard to possible foreign and Colonial developments in certain important trades carried on by them or in their respective districts. The trades dealt with in the first series of monographs are cutlery, iron and steel wire, hollow-ware (enamelled or tinned), woollen and worsted piece goods, and cotton hosiery (stockings and socks)."

To those who have followed the German "culture" for the last thirty or forty years it is well known that the fostering of their industries in that country by technical instruction in all forms has been increasing, and it will be found that our manufacturers will have the greatest difficulty in carrying out the Government's intention precisely in those branches of industry in which technical instruction of the most advanced kind, with accompanying research, has been most lacking in Britain.

For some time before the war a committee of the British Science Guild was preparing a statement showing the disadvantages under which the optical trades suffer in this country, and we are glad to see that the President of the Board of Trade has now appointed a committee "to consider and advise as to the best means of obtaining for the use of British industry sufficient supplies of chemical products, colours, and dye-stuffs of kinds hitherto largely imported from countries with which we are at present at war." Of this Committee Lord Haldane is chairman, and Dr. Beilby and Profs. Meldola and Perkin are among the members.

Let us hope that these and other similar efforts will be fruitful of result. Let us increase our "culture," not as part of a settled plan for the detriment of other countries, but as a serious endeavour to advance our own Empire and modern civilisation generally with all that it brings with it.

BIOLOGY OF THE SEX- AND BLOOD-CELLS.

(1) *Artificial Parthenogenesis and Fertilisation.* By Jacques Loeb. Originally translated from the German by W. O. Redman King. Supplemented and revised by the Author. Pp. x+306. (Chicago: University of Chicago Press; London: Cambridge University Press, n.d.) Price 10*s.* net.

(2) *The Biology of the Blood-cells. With a Glossary of Haematological Terms.* By Dr. O. C. Gruner. Pp. xii+392+plates. (Bristol: John Wright and Sons, Ltd., 1913.) Price 21*s.* net.

(1) THE development of the female cell or egg without fertilisation by the male cell or sperm—parthenogenesis—has been known to occur among the plant lice, or aphides, since the eighteenth century, but the artificial production of a similar phenomenon—artificial parthenogenesis—is essentially an accomplishment of the closing decades of the nineteenth century. This book gives an excellent and fascinating summary of the considerable amount of experimental work which has now been performed on this subject. Artificial parthenogenesis has been principally carried out with the eggs of sea-urchins, but the same kind of results have also been obtained with those of starfish, annelid worms and molluscs, and also with frogs and toads. Although there is usually considerable mortality among the artificially fertilised forms during the earlier periods of development, Delage has reared two parthenogenetic larvæ of the sea-urchin during sixteen months to a stage of sexual maturity, and Loeb and Bancroft raised tadpoles, and even a young frog with eggs in the sex-glands, from artificially fertilised frogs' eggs!

Commencing with some general remarks on the morphology of development, the influences of oxidation and of membrane formation on the development of the fertilised egg are considered. Apparently oxygen is necessary for development, and all observations point to the conclusion that the processes determining or underlying nuclear division depend upon oxidation. While a certain amount of oxidation proceeds in the unfertilised egg (and ultimately leads to its disintegration and death), the essential effect of the entrance of the sperm seems to be an acceleration, it may be to six-fold, of the oxidation processes, and if fertilised eggs be deprived of all oxygen no nuclear or cell division occurs; other reactions, such as hydrolyses, also doubtless take place. Another result of fertilisation is the immediate formation of a membrane, the fertilisation membrane, which surrounds the egg, after which the chemical processes that underlie development ensue.

The earlier successful attempts to induce artificially the development of sea-urchin eggs were obtained by the use of hypertonic sea-water (100 c.c. sea water + 2 grams sodium chloride). The eggs are first soaked in the hypertonic solution for 2–4 hours, and are then returned to ordinary sea-water; if allowed to remain in the

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hypertonic solution no development takes place. Other hypertonic solutions, provided they possess a similar osmotic action and are not poisonous (as is the case, for instance, with copper salts), may also be used. Better methods have since been devised, *e.g.* treatment first with a fatty acid, such as butyric, then with sea-water, next with the hypertonic solution and finally removal to sea-water. The fatty acid initiates membrane formation, the hypertonic solution the oxidation processes. Various substances, such as saponin, which have a lytic or solvent action upon the cortical layer of the egg and therefore lead to membrane formation, can also be substituted for fatty acid.

Another fact of considerable interest is that blood or tissue-extracts, or the dead or living sperm, of a *foreign* species will induce membrane formation in the unfertilised sea-urchin egg, while the extracts of the sea-urchin itself are inefficient to do so and the *living* sperm is alone effectual. This appears to be due to the fact that the foreign materials can diffuse into the egg, while its own materials are unable to, but must be carried by the *living* sperm. Various questions connected with heredity are discussed, and finally a chapter deals with the interesting question—can an embryo develop from a sperm? Apparently in yolk and white of egg, fowl sperm can undergo transformation into a nucleus, but we are not yet in a position to state that the sperm can undergo mitosis outside the egg. Altogether this book can be recommended as an authoritative statement on artificial parthenogenesis by one who has himself contributed so much to the subject.

(2) Comparatively simple as the structure of the blood seems at first sight to be, the more it is studied the more complex it becomes, and the literature dealing with this subject has now become truly enormous. In the present volume the author has attempted to summarise the researches that have been carried out on the structure, functions, and origin of the various elements of the blood, both normal and abnormal, which make their appearance in cases of disease. On the whole we think the author has accomplished his object, and has produced a reference book which will be very useful to those who are working at this subject. A bibliography, a glossary of hæmatological terms (which runs into more than thirty pages), and indexes to subjects and to authors, complete a work which must have entailed a considerable amount of labour.

R. T. H.

MATHEMATICAL TEXT-BOOKS.

(1) (*a*) *Plane and Solid Geometry.* By Prof. W. B. Ford and C. Ammerman. Edited by E. R. Hedrick. Pp. ix+321+xxxiii. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1913.) Price 5*s.* 6*d.* net.

(*b*) *Solid Geometry.* By Prof. W. B. Ford and C. Ammerman. Edited by E. R. Hedrick. Pp. ix+215–321+xlix. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1913.) Price 3*s.* 6*d.* net.

(2) *A School Course in Geometry.* By W. J. Dobbs. Pp. xxii+427. (London: Longmans, Green and Co., 1913.) Price 3*s.* 6*d.*

(3) *Analytic Geometry and Principles of Algebra.* By Prof. A. Ziwet and L. A. Hopkins. Pp. viii+369. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1913.) Price 7*s.* net.

(4) *Slide-Rule Notes.* By Colonel H. C. Dunlop and C. S. Jackson. Pp. 127. (London: Longmans, Green and Co., 1913.) Price 2*s.* 6*d.* net.

(5) *A First Numerical Trigonometry.* By W. G. Borchardt and the Rev. A. D. Perrott. Pp. xi+159+xvii+xvii. (London: G. Bell and Sons, Ltd., 1913.) Price 2*s.* 6*d.*

(6) *Elementary Graphic Statics.* By J. T. Wight. Pp. xii+227. (London: Whittaker and Co., 1913.) Price 4*s.* net.

(7) *Models to Illustrate the Foundations of Mathematics.* By C. Elliott. Pp. viii+116. (Edinburgh: Lindsay and Co., 1914.) Price 2*s.* 6*d.* net.

(8) *Exercises in Mathematics.* By D. B. Mair. Pp. xi+469. (London: Macmillan and Co., Ltd., 1914.) Price 4*s.* 6*d.*

(9) *A School Statics.* By G. W. Brewster and C. J. L. Wagstaff. Pp. viii+248. (Cambridge: Heffer and Sons, Ltd., 1913.) Price 3*s.* net.

(10) *Proceedings of the London Mathematical Society.* Second series. Vol. xii. Pp. lix+488. (London: Francis Hodgson, 1913.)

(1) IN America, as in England, the teaching of geometry has altered recently both in method and scope; and these changes are indicated in the report of the committee of the National Education Association, the recommendations of which have been in the main adopted by the authors of this volume. The limitations of the subject-matter are similar to those with which English students are familiar, but there is a marked difference in the arrangement. The treatment of areas is postponed nearly to the end of the course, thus enabling angle and

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